

Wollaston Medal, which was then awarded to him by the Council. Von Hauer had been elected a foreign member of the Society in 1871. In 1886 he was appointed Intendant of the Natural History Museum at Vienna, and since 1892 he has been a life-member of the upper house of the Austrian parliament. He died on March 20, aged seventy-seven.

NOTES.

AT a meeting of members of the Royal Institution on Monday, it was announced that the Hodgkins Medal, the first gold medal for scientific work ever given by the Smithsonian Institution, has been conferred upon Prof. J. Dewar, F.R.S., in recognition of his researches on the liquefaction of air.

MR. A. P. TROTTER (at present Government electrical engineer for Cape Colony), has been appointed electrical adviser to the Board of Trade, in succession to Major Cardew, who has resigned.

A FRENCH warship, upon which experiments in aerial telegraphy will be made, has arrived at Calais, and the experiments will be carried out between different points in the English Channel and the South Foreland. The French Government have under consideration the question of adopting the system generally for use in the navy. It is reported that the Wireless Telegraphy Company have been approached by the representative of a proposed syndicate, which desires to acquire the sole rights of establishing wireless telegraphic communication between England and America.

THE Rotterdam correspondent of the *Times* reports that the seventh Dutch Physical and Medical Congress opened on Friday, April 7, at Haarlem. Though it is a national institution the Congress is entertaining a foreign guest, Prof. Ramsay. On Thursday evening, in an address on the merits of Haarlem as a home of science, Prof. Bosscha, the director of Teyler's Museum, mentioned Kirschhuyzen, the humble teacher of mathematics whose manual of algebra was translated into Latin by Newton. Prof. Bosscha, in opening the Congress on Friday, reviewed the progress that science has made in this century, and dwelt especially on the researches of Lord Kelvin. In one of the sections Prof. Ramsay delivered an address on recent researches, and at the end the audience gave him enthusiastic applause.

DURING the months of March and April a public conference is being held at the Botanical Institute at Rome, under the presidency of Prof. Pirotta, on the Nutrition of Plants.

DR. L. BUSCALIONI has set out for a lengthy botanical expedition to Brazil, especially to the little known affluents of the Amazon. The collections will be forwarded to the Botanical Museum at Rome.

WE learn from the *Journal of Botany* that Mr. I. H. Burkill has been appointed assistant to the Director of Kew Gardens, and that Mr. C. C. H. Pearson has joined the Kew staff as assistant for India.

WE regret to have to report the death of two distinguished biatomists—Surgeon-Major G. C. Wallich, M.D., who died in London on March 31, in his eighty-fourth year, and Count Abbé F. Castracane, of Rome. Dr. Wallich and Count Castracane were, with one exception, the two oldest Honorary Fellows of the Royal Microscopical Society.

SIR WILLIAM JENNER, who died on December 11, 1898, bequeathed 10,000*l.* to the Royal College of Physicians of London. The bequest will, however, only take effect in default

of appointment being made by Lady Jenner of the ultimate residue of the estate, if any, after the principal legacies have been provided.

THE death is announced of Dr. P. L. Rijke, of the University of Leyden, at eighty-six years of age, and of Dr. Oliver Marcy, professor of natural history in North-Western University, Evanston, U.S.A.

It is announced in *Science* that the report that Dr. T. J. J. See has been designated Chief of the U.S. Nautical Almanac Office is incorrect.

THE Imperial Academy of Sciences, St. Petersburg, celebrates to-day the fiftieth anniversary of the foundation of the central physical observatory.

THE London Geological Field Class, conducted by Prof. H. G. Seeley, F.R.S., will commence their annual series of Saturday afternoon excursions on April 22. Full particulars can be obtained from the Hon. Secretary, Mr. R. Herbert Bentley, 43 Gloucester Road, Brownswood Park, N.

THE death is announced of Mr. Joseph Stevens, for some years honorary curator of the Reading Museum. Mr. Stevens was a Berkshire man, having been born at Stanmore in that county on April 14, 1818. After qualifying for the medical profession he settled in the village of St. Mary Bourne, in the Test valley between Andover and Highclere in Hampshire. Here he devoted himself largely to archaeological subjects, and gave considerable attention also to geology. In 1867 he published, in pamphlet form, "A Descriptive List of Flint Implements found at St. Mary Bourne; . . . with a sketch of the geological features of the upper Test valley, and a list of fossils from the upper and lower Chalk," &c. He was the author of other papers on similar subjects. He died on April 7, at the age of eighty-one.

THE Easter dredging expedition of the Liverpool Marine Biology Committee was brought to an untimely end by an unfortunate boat accident in Port Erin Bay. On March 31 dredging and trawling were carried on from the Fisheries steamer *John Fell*, and on the following forenoon the Tanner closing net and the method of pumping plankton from the bottom by means of a hose-pipe were tried on the steamer. On the afternoon of Saturday, April 1, two of the workers in the Biological Station went out to collect surface plankton in a small boat. While hauling in the tow-net when returning, the boat capsized, and both were thrown into the water. One of them (Mr. E. J. W. Harvey, of Liverpool) was picked up by another boat from the Biological Station, but his companion (Mr. Eric T. Townsend, of Manchester) was unfortunately drowned before assistance could reach him. The body was eventually recovered. Mr. Townsend was a student of the Owens College, and was occupying the College work-table at the Port Erin Biological station.

THE Belgian Royal Academy has issued its programme of subjects for essays in competition for gold medals of value 600 francs each, to be awarded in 1900. The essays are to be sent to the Secretary before August 1, 1900, each bearing a motto, and written in French or Flemish. Contrary to the usual custom, five subjects instead of three have been selected in each of the two departments of mathematical and physical science and of natural science. The mathematical and physical questions refer to (1) critical phenomena in physics; (2) viscosity of liquids; (3) the carbon derivatives of an element whose combinations are little known; (4) the history and theory of variation of latitude; (5) the algebra and geometry of n -linear forms where $n > 3$. The questions in natural science refer to (1) the geological formations at Comblain au Pont, and whether these are

Devonian or Carboniferous; (2) the physical modifications produced in minerals by pressure; (3) the organisation and development of the platoda; (4) the presence of a nucleus in the Schizophyta; and (5) the Devonian flora of Belgium.

M. P. VILLARD, writing in the *Journal de Physique* for March, continues his observations on cathodic rays. Among other interesting conclusions, the author is led to the view that hydrogen plays a prominent part in the production of cathodic rays; this view explains the action of these rays in reducing oxides.

M. D'OCAGNE's system of "abaques" is remarkable for the number of problems it enables the mathematician and the physicist to solve graphically. An interesting application of the method is given by M. A. Lafay in a recent number of the *Journal de Physique*, where Fresnel's laws of reflection and refraction are represented by means of "abaques."

IN a note communicated by M. E. Carvallo to the *Journal de Physique* for March, on Clausius' theorem, the author points out that although abundant proof is given in text-books that for a reversible cycle $\int dQ/T = 0$ the property that this integral is negative for irreversible cycles receives scanty demonstration. The author considers it desirable that this question should be more fully considered in elementary courses than is usually done, and points out that this can best be effected by a more or less detailed consideration of the different transformations which lead to irreversible cycles.

DR. RUDOLF MEWES has published a second edition of his pamphlet on "Licht-, Electricitäts-, and X-Strahlen," of which the first edition appeared in 1896. The vast literature on Röntgen rays which has accumulated during the past three years has rendered it necessary for the author to restrict his attention to researches bearing on the analogy between Röntgen rays on the one hand and light and electric waves on the other, both in their nature and in their fundamental laws. The author in an appendix also discusses an application of the wave theory to the problem of gravitation.

UNDER the title "Two discharges derived from one condenser," Prof. A. Röntgen, writing in the *Atti dei Lincei*, viii. 1, describes the phenomena produced when a condenser, charged by an electrostatic machine working uniformly, is connected, by means of two pairs of coils, with a Röntgen ray tube on one hand and a spark gap on the other, the two being arranged in parallel. By varying the self-induction of the coils and the length of the sparking gap, the two discharges are made to take place simultaneously, and the intensity of the Röntgen rays is made a maximum; and Prof. Röntgen gives a mathematical investigation of the results observed in his experiments.

IN the *Proceedings* of the Philosophical Society of Glasgow, Dr. W. J. Fleming describes a simple and inexpensive method of localising with Röntgen rays. This, like other methods, is based on the measurement of the distance apart at which two images are produced by rays impinging on the object in two directions at known angles to each other. The advantage of the stand described by Dr. Fleming is that it enables the tube to be rotated on two axes crossing at the centre of the anode, the point from which the rays proceed. In this way it is possible to make the slanting surface of the anode face in any direction in which it is desired to project the rays, without affecting its position; while the change of position of the tube can be effected separately by moving the supporting stand, and can be readily measured.

THE annual report of the Institute of Jamaica states that an almost complete series of the thirty-five known species of

Jamaica actiniaria, collected by the curator, Mr. J. E. Duerden, has been placed on exhibition. A large series of sponges, contributed by the Caribbean Sea Fisheries Development Syndicate, constitutes almost the beginning of the local collections in this group. One compact massive sponge is two feet in diameter. A 3 to 5 per cent. solution of formalin has now been employed for over two years as a preservative fluid for fish, coelenterates, holothurians, &c., and has proved satisfactory, preserving the natural form and colours of the animals better than alcohol. A polished slab of mahogany, four feet in diameter, has been added to the collection of woods, and illustrates the irregular increase in thickness of tropical trees, as compared with the regular annular rings in dicotyledons of temperate parts. New types and many duplicate examples of relics of the aboriginal Indian inhabitants continue to be received and added to the already large collection on view and in store cases.

MESSRS. E. H. HALL AND C. H. AYRES contribute to the *Proceedings* of the American Academy of Arts and Sciences a determination of the thermal conductivity of cast iron. In their experiments a disc of cast iron was coated with an electrolytic deposit of copper on its two faces, and the difference of temperature of the faces recorded by galvanometric readings depending on the thermo-electromotive forces of the two couples thus formed. Water at different temperatures was made to flow across the two copper faces, and the total flow of heat measured by comparing the differences of temperature between the water entering and leaving the vessels. The thermal conductivity of the cast iron used was found to be about 0.1490 at 30° C., its temperature coefficient being about -0.00075 between 20° and 75°. The electric conductivity of this sample was about 112,200 C.G.S. units, its temperature-coefficient between 17° and 67° being about -0.00118. The method used is thought by the authors to be capable of giving better results than have yet been obtained by it.

IN these columns frequent reference has been made to Dr. Folgheraiter's researches on the magnetisation of ancient vases, from which the author long ago advanced the hypothesis that the magnetic dip had changed sign within historic times at the places where these vases were made. The evidence on this point, derived from examination of Grecian vases in the Museums of Florence and Syracuse, forms the subject of the most recent paper of the series published by Dr. Folgheraiter in the *Atti dei Lincei*, viii. 5. Some of the vases, owing to the ornamentations and projections above their mouths, could only have been placed in the furnace in an upright position, and although the presence of these projections rendered it necessary for Dr. Folgheraiter to restrict his observations to the bases of the vases, the sign of the magnetic dip, if not its magnitude, was readily determinable. Dr. Folgheraiter concludes (1) that at the commencement of the period of fabrication of the Corinthian vases and of the Attic ones with black figures on a red background (seventh century B.C.), the magnetic dip in Greece was austral; (2) that shortly afterwards, perhaps at the beginning of the sixth century, while Corinthian vases were still being made, the magnetic dip was nearly zero, and then became boreal; (3) that at the end of the period of fabrication of the Attic vases (about 400 B.C.) the magnetic dip was boreal and amounted to about 20°.

AMONG the latest results obtained by Drs. B. Grassi, A. Bignami and G. Bastianelli, regarding the propagation of malaria by mosquitos, the following conclusions are stated in their paper in the *Atti dei Lincei*, viii. i. (1) The hæmosporidia of malaria undergo in man the well-known life-cycle characterised by the long duration of the amœboid phase and the absence of incapsulate stages; in this cycle they are reproduced an indefinite number of times, but also give rise to

forms which in man remain sterile. Such forms on entering the intestine of the perfect insect of *Anopheles claviger*, are developed as typical sporozoa which form an enormous number of sporozooids, and these, accumulating in the salivary glands of the mosquito, return to man in the act of puncture. They may, however, instead undergo another life-cycle giving rise to sporogonia. (2) The development of malarial hæmosporids in the body of the mosquito has been demonstrated for the parasite of autumnal fever and for that of ordinary fever. (3) While the transference of the hæmosporids from man to mosquitos and *vice versa* has been abundantly proved, it is still an undecided point whether the parasites are transmitted from mosquitos to their progeny.

In the *Journal of Conchology* for April 1899, Mr. L. St. G. Byne describes a series of investigations undertaken by him, at the instigation of Mr. J. Cosmo Melvill, on the corrosion and consequent deterioration of marine shells in public collections. This corrosion Mr. Byne is led to attribute to the action of butyric acid upon the calcium carbonate of the shells. The butyric acid was derived originally from the decay of portions of the animal left in the shells. A subsidiary cause is the action of acetic acid, formed by the fermentation of the gum used in attaching the shells to tablets. The white powdery substance upon the surface of the affected shells consists of calcium butyrate, mixed in some cases with a little calcium acetate. Mr. Byne thinks that, in all probability, treatment with corrosive sublimate solution will prove an effectual remedy. We would suggest that Mr. Byne's conclusions may have an important bearing on another question, namely, the permanency or otherwise of microscopic preparations of foraminifera.

THE *Comptes rendus* of the Paris Academy of March 27 contains a notice, by M. Léon Teisserenc de Bort, of three unmanned balloon ascents made under his directions on March 24. One of the balloons was despatched from his observatory at Trappes at 8h. 30m. a.m., in clear weather, and with a light north-west wind, and fell at Trèves (in Rhenish Prussia); the instruments have not yet been returned. Another was sent up near Limoges at 9h. 27m. a.m., in cloudy weather, with moderate N.N.W. wind, and occasional snow-squalls. It fell at Péroles, after a flight of thirty-seven miles, having attained an altitude of about twenty-eight thousand feet; the lowest temperature recorded was $-47^{\circ}2$, the temperature on the ground being $32^{\circ}5$. In order to determine the influence of the sun's rays on the temperatures recorded, one of the balloons was despatched from Trappes (before sunrise) at 3h. 45m. a.m. This fell about seventy miles in an east by south direction. At the above altitude a temperature of $-61^{\circ}4$ was recorded, the temperature on the ground being $26^{\circ}6$.

WE have received from M. A. Lancaster, the director of the Belgian Meteorological Service, a very interesting sketch of the climate of the Congo, abstracted from the *Annuaire* of the Royal Observatory of Belgium for 1899, and chiefly based upon a work entitled "Le Climat du Congo," by A. Lancaster and E. Meuleman, published in 1898. In our latitude temperature is the principal element which determines the character of the seasons, but in the Congo State temperature is relatively uniform throughout the year, the principal element being rainfall, the frequency and amount of which are very marked during some months, while in others rain completely fails. In the equatorial zone, the mean temperature in the afternoon during the year is generally about 86° and about 68° during the night, with but slight variation from one day to another. The rainy season commences in the early part of October, and ends about the middle of May. In proportion to the distance from the coast and to the proximity of the equator, the wet and dry seasons are less marked, and rain

falls with variable intensity throughout the year. Generally speaking, the rainfall of the Congo is nowhere exceptional. Thunderstorms are very frequent in the interior of the State; in the equatorial regions they occur at all seasons, while more to the south and in the west they only take place during the rainy season.

THE Chicago Health Department are to be congratulated on the results which they are able to publish attending the use of diphtheria antitoxin in combating diphtheria. During a period of forty-one consecutive months, 4000 cases of "true diphtheria" were treated with a mortality rate of less than 6.8 per cent., whilst within the last four months still greater success has followed the work of the department, for 418 cases have been treated with a mortality of less than 4.8 per cent. In the three years following the introduction and use of the antitoxin, the department record a decline in deaths from diphtheria of 43 per cent., compared with the death rate from this disease registered for the three years previous to the use of antitoxin.

THE *Journal of the Society of Arts* contains in one of its recent numbers the report of the lecture given before the Society by Mr. H. A. Acworth, on leprosy in India. In the discussion which followed, a warm tribute was paid to the author for the splendid work which he carried out in starting, entirely through his own efforts, a magnificent leper asylum on the outskirts of Bombay at Matoonga. As Lord Onslow (who presided) justly stated, "after mature consideration, the Government of Bengal and the Supreme Government of India had adopted the recommendations which Mr. Acworth was the first to bring into practice, viz. the segregation of lepers." Opinion is still divided as to the wisdom of this policy in combating leprosy, but there is no doubt that Mr. Acworth's experiment has been attended with success. To all interested in this important subject, the paper in question contains a mass of interesting information, as well as statistics culled from very various sources.

THE University of the State of New York has just issued, as *Museum Bulletin* No. 19, "A guide to the study of the geological collections of the New York State Museum," by Dr. Frederick J. H. Merrill, director and state geologist. The bulletin aims to supplement the collections with such general information as cannot be given by cabinet specimens, and to direct visitors to trustworthy sources for more detailed information. For this purpose it places within the reach of students a brief synopsis of the geology of the State, and shows by photographic illustrations the exact appearance of many typical exposures. After a general introduction, follow sections dealing with the geologic formations of the State, economic geology, suggestions for study under the heads of geological text, reference-books and field work, and the origin of the museum. The bulletin, which may in fact be regarded as an introductory text-book of geology illustrated by local examples of geological structures, contains 162 pages of text and 119 plates, and is sent post paid by the University for forty cents. Teachers of science in the colleges and schools of the State will doubtless appreciate the efforts of Dr. Merrill and his associates to extend the usefulness of the museum and increase the interest in the collections.

A CAREFUL examination of the rude stone monuments of Japan, and of the sepulchral chambers termed "dolmens," has led Mr. W. Gowland to conclude (*Transactions and Proceedings of the Japan Society*, vol. iv. part iii., 1899) that they were built by the ancestors of the present Japanese. The aboriginal inhabitants were apparently the Ainu, who occupied the whole country until they were gradually driven back to the north by a more powerful race. Whence came the invaders from whom

the present Japanese have descended is not known, and he dolmens afford little information upon this question. No dolmens have been found in China, and those which occur in Korea differ entirely from those in Japan. In fact, Mr. Gowland points out, it is not until, in passing westwards through Asia, the shores of the Caspian Sea are reached, that dolmens similar to the Japanese kind are found; and for more closely allied forms it is necessary to go yet further to Western Europe. The approximate date of the end of the Dolmen Period is regarded as lying between 600 and 700 A.D., and of its beginning about the second century B.C. To sum up, Mr. Gowland shows "that the period during which the dolmens were built in Japan was characterised, from its beginning to its close, by a well-developed civilisation and a culture which had advanced far beyond the limits of barbarism, and was, in fact, the birth-time of the ornamental arts; that the builders of the dolmens were the ancestors of the present Japanese; that during this period the clans of the race had driven out the aborigines from the richest portion of the country, had become a settled and united people, and made great progress in both the arts and industries."

"THE Permocarboneous Fauna of Chitichun, No. 1," forms the subject of a memoir by Prof. Carl Diener, recently published by the Geological Survey of India in the Himalayan fossil series of *Palæontologia Indica*. The fossils described occur in the white limestone which forms the main mass of the peak Chitichun (17,740 feet) in the Tibetan area between the Laptal ranges and the head of the Dharma valley. They represent altogether forty-eight species, among which brachiopods, numbering forty species, far predominate, both in species and individuals, and comprise five-sixths of the entire fauna. With regard to the general character of the fauna, Prof. Diener sums up his views as to the stratigraphical position of the Chitichun limestone as follows:—"The Chitichun limestone is approximately homotaxial with the upper division of the Productus limestone in the Salt Range. It probably corresponds in age to the permocarboneous horizon (Artinskian stage) in Russia, but the description of the brachiopods from the Fusulina limestone of Sicily must be awaited for, before it is possible to decide whether it does not hold a slightly higher position in the stratigraphical sequence than the Artinskian deposits."

WE have received the second edition of Dr. W. B. Phillips' monograph on iron making in Alabama, published by the Geological Survey of that State. It contains a general description of the ores, fluxes, and fuels used, together with some particulars of the manufacture. The first edition was issued in 1896, and did much to further the development of the iron industry of the State. Since then the blast furnace practice has not materially altered. The same soft and hard calcareous hæmatites and brown ores are used, and the same coke. The use of dolomite as flux has steadily increased. The cheap soft red ore is becoming scarcer, and consequently new deposits of brown ore have been opened. The coke industry shows some notable advances. A complete coal-washing plant, with a capacity of forty tons an hour, and a plant of 120 Semet-Solvay by-product coke ovens have been erected. In connection with the making of steel, the author gives a full description of the manufacture of basic iron in Alabama, and details of the cost of making pig-iron. The lowest cost reached was 23s. per ton. Indeed the figures given clearly show that the cheapest pig-iron made in the world is made in Alabama; and the exportation of 218,633 tons to England and the continent during 1897, as against 65,000 tons in 1896, shows the importance of this fact in the development of outside markets for Alabama iron.

MESSRS. DULAU AND CO., of Soho Square, have issued an eight-page catalogue of books and papers on Fossil Botany.

NO. 1537, VOL. 59]

MR. CLEMENT REID has in preparation a work on "The Origin of the British Flora," which will shortly be published by Messrs. Dulau and Co.

MR. R. BULLEN NEWTON and Mr. Richard Holland contribute to the *Annals and Magazine of Natural History* for March an account of some Nummulites, Orbitoides, and other Foraminifera from Eocene and later Tertiary strata in Borneo.

THE sixth volume of "A System of Medicine," edited by Prof. Clifford Allbutt, F.R.S., was published on Tuesday by Messrs. Macmillan and Co., Ltd. The subjects dealt with are diseases of the circulatory system (continued), diseases of muscles, and diseases of the nervous system. Prof. Welch's contribution on thrombosis and embolism, which was not received in time for vol. v., appears in the new volume. We propose to deal with these and succeeding volumes when the work is complete.

A Dainty little monthly magazine of photographic information has just made its appearance under the title of *The Photo-Miniature*. It is edited by Mr. John A. Tennant, and published by Messrs. Tennant and Ward, New York (London: Dawbarn and Ward, Ltd.). A survey of the progress of photographic optics, so far as it bears upon modern lenses, forms the greater part of the first number of the magazine; the remaining pages consisting of a digest of photographic information.

THE "Handbook of Jamaica" for 1899, comprising historical, statistical and general information concerning the island, compiled by Messrs. T. L. Roxburgh and J. C. Ford, has been published by Mr. Edward Stanford. Among the events of 1898 mention is made of the establishment, already announced in these columns, of a West India Weather Service in connection with the Government observatories and stations in the United States and several islands in the Caribbean Sea.

THE third memoir on the materials collected on the atoll of Funafuti has been published by the Australian Museum, Sydney. Mr. Thomas Whitelegge describes the Hydrozoa, Scyphozoa, Actinozoa, and Vermes in the collection; and Mr. Charles Hedley describes the Molluscs. In his introductory remarks, he subjects British conchologists to criticism for neglecting anatomical material in order to discover new species. "As a consequence," he says, "of the devotion of the London school to the study of the Pacific fauna, we have a great mass of involved synonymy, inadequate descriptions, poor figures or none, crude classification, and total neglect of soft anatomy." Owing to pressure of museum duties, Mr. Hedley has been compelled to omit various inquiries on anatomy and other related matters from his own report; and, with the exception of brief notes on geographical distribution, he restricts himself to the mere systematic treatment of the species.

It has been known for some time that the transition temperature, or "melting point," of crystallised salts should be constant for pure materials; but prior to the researches of Messrs. T. W. Richards and J. B. Churchill, it was not realised that this constancy was sufficient for standardising thermometers. In these experiments, which are published in the *Proceedings* of the American Academy of Arts and Sciences, a complete study was first made of sodium sulphate, the transition temperature of which was found to be remarkably constant at 32°·484 C. on the mercury thermometer scale, or 32°·379 C. on the hydrogen scale. These results were then extended to eight other salts, the preliminary figures for which are given ranging from 19·7 for sodium chromate, Na₂CrO₄·10H₂O to 78° for barium hydroxide, Ba(OH)₂·8H₂O. Commenting on the suggestion by Meyerhoffer and Saunders to use such baths for securing constant temperature during determinations of electrolytic con-

ductivity and similar measurements, the authors think that the Ostwald thermostat bath is still the safest and most convenient appliance for preserving a constant temperature in the laboratory, the baths of "melting" crystals finding their greatest use in the standardising of thermometers at fixed points.

THE additions to the Zoological Society's Gardens during the past week include a Rhesus Monkey (*Macacus rhesus*, ♂), from India, presented by Mr. David M. Greig; two Western Pin-tailed Sand Grouse (*Pterocles pyrenaica*) from Spain, deposited; four Black-tailed Hawfinches (*Coccothraustes melanurus*) from Japan; a Lapwing (*Vanellus vulgaris*), European, purchased.

OUR ASTRONOMICAL COLUMN.

COMET 1899 *a* (SWIFT).—The unfavourable conditions in England appear to have prevented any observations of this comet, but on the continent it has been frequently seen. From a detailed list of all the recorded observations given in *Ast. Nach.* (Bd. 149, No. 3554), we see that the reported presence of a central condensation is confirmed. Most of the observers agree in estimating the magnitude as about 6.5, or just visible to the naked eye. Prof. Max Wolf says that it was quite bright in the finder, and easily seen with the naked eye when guided to the correct place by the telescope. With a 6-inch telescope a short tail was distinctly visible.

The comet is now very near the sun, but under favourable conditions may possibly be seen with the help of the following extended ephemeris:—

oh. Berlin Mean Time.				
1899.	R.A.		Decl.	Br.
	h.	m.	s.	
April 13	...	1 19	36 ...	+ 9 36.7 ... 3.6
14	...	15	8 ...	10 15.4 ... 3.7
15	...	10	41 ...	10 54.0 ... 3.5
16	...	6	18 ...	11 32.4 ... 3.4
17	...	1	2 0 ...	+ 12 10.8 ... 3.3

In the beginning of May, however, it is likely that the comet will be easy of observation in the early morning, as it will rapidly recede from the sun after perihelion passage.

TUTTLE'S COMET (1899 *b*).—The previous ephemeris given was based on data obtained in 1885; but successful observations, obtained at Heidelberg, Lick and Königsberg, have enabled Herr J. Rahts to recompute the elements and furnish a more accurate ephemeris, which he has communicated to *Ast. Nach.* (Bd. 149, No. 3555).

Elements.

T = 1899, May 4.5 Berlin Mean Time.

$$\begin{aligned} M &= 359^{\circ} 59' 46.7'' \\ \pi &= 116^{\circ} 29' 3.0'' \\ \Omega &= 269^{\circ} 49' 53.6'' \\ i &= 54^{\circ} 29' 16.3'' \\ \phi &= 55^{\circ} 15' 23.7'' \\ \mu &= 259'' 6234 \end{aligned} \quad \left. \begin{array}{l} \\ \\ \\ \\ \\ \end{array} \right\} 1900.0$$

Corrected Ephemeris for 12h. Berlin Mean Time.

1899.	R.A.		Decl.	Br.
	h.	m.	s.	
April 13	...	3 43	27.7 ...	+ 19 35 52 ...
14	...	47	3.7 ...	19 11 13 ... 1.71
15	...	50	39.2 ...	18 46 17 ...
16	...	54	14.0 ...	18 21 5 ...
17	...	57	48.2 ...	17 55 37 ...
18	...	4	1 21.7 ...	17 29 54 ... 1.77
19	...	4	54.5 ...	17 3 55 ...
20	...	8	26.6 ...	16 37 42 ...
21	...	11	58.1 ...	16 11 14 ... 1.80

NEW STAR CATALOGUE.—The eighth volume of the "Astronomical Observations and Researches made at Dunsink," the observatory of Trinity College, Dublin, contains a catalogue of the mean places of 1101 stars, together with the separate results of 4022 observations of right ascension and 3999 observations of declination, the range of declination being from -28° to $+80^{\circ}$.

The observations were made with the Pistor and Martin's meridian circle by Mr. Charles Martin, under the direction of

Prof. A. A. Rambaut, then Astronomer Royal for Ireland, during the period 1896, March 16, to 1897, July 17. All the places are brought up to epoch 1900, and the probable error is about ± 0.0328 s. in R.A., and ± 0.480 in Decl. A useful feature of the catalogue is the inclusion of the corresponding numbers denoting the various stars in other catalogues in vogue, viz. Bradley's, Piazz's, and the B.A.C., and various others, so that cross references are readily seen.

THE SUN'S HEAT.—Mr. A. S. Chessin, in a communication to the *Astronomical Journal*, vol. xix. No. 456, relating to Dr. See's article in *Ast. Jour.*, No. 455, noticed on p. 350 of the current volume, writes as follows:—

"Allow me to observe with regard to Dr. See's 'remarkable' law, which he discusses at length in the last number of the *Journal*, that it is derived by the author with a superb neglect of the principles of thermodynamics. The last stage of the 'proof' is especially curious, as the assertion that T_0 must be multiplied by $\frac{R_0}{R}$ in order to preserve the equilibrium, is nothing else than an assumption of that very 'law' which Dr. See proposes to derive."

ALLOYS.

THE fifth Report, by Sir William Roberts-Austen, to the Alloys Research Committee of the Institution of Mechanical Engineers contains some details of much scientific interest. The system of taking cooling curves of metals and alloys, originated by the author of the Report, is now well known, but in the present Report he has indicated a method for obtaining curves of extraordinary delicacy. An ordinary thermo-junction of platinum and platinum iridium wires is placed within the mass of metal which is heated in a vacuum tube, and allowed to cool from a bright red heat. The result, in the case of iron, is

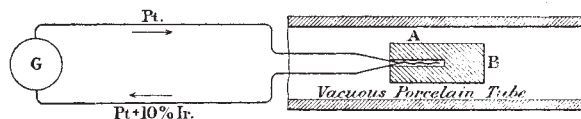


FIG. 1.

that as the mass cools down there are several points at which heat is evolved. In the curve of iron of a high degree of purity only two such points have hitherto been detected, one at about 890° and the other at 760° . Both of these have been supposed to represent allotropic changes in the metal, and the lower one (at 760°) is that at which the magnetic properties of the iron change. In ordinary cooling curves, however, both these points have been indicated by little more than a change in direction of the curves. By adopting the following method curves of great delicacy have been obtained, and the result is that the old

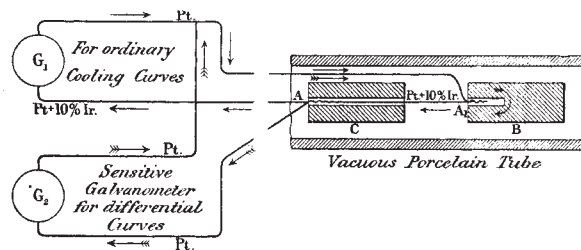


FIG. 2.

changes in direction of the curves in the case of iron, have been developed into large prominences and, moreover, new points in the cooling curves, have been discovered.

The following is the new method, of which a very brief description will be sufficient. In the ordinary method, the twisted end of the thermo-junction A (Fig. 1) is placed in the heated mass of metal B under examination, and its free ends are connected with the galvanometer G. In the new method (Fig. 2) two thermo-junctions, A and A₁, are employed. One of these